STANDARDIZATION AND QUALITY

UDC 691.618.54:658.516

STANDARDS FOR BUILDING GLASS AND BUILDING-GLASS PRODUCTS ADOPTED IN THE RUSSIAN FEDERATION

O. A. Emel'anova[1] and A. G. Chesnokov[1]

Translated from Steklo i Keramika, No. 2, pp. 5 – 7, February, 2000.

The standards for building glass currently used in Russia include international standards of the CIS, USSR state standards, Russian Federation state standards, and a number of specifications developed in the industry or by production companies.

The State Institute of Glass (GIS) JSC is developing state standards and industrial specifications for building glass. The State Construction Committee of Russia (Gosstroi) has made GIS the principal entity responsible for standardization of the corresponding products. Moreover, GIS used to fulfill the function of organizing metrological services in the glass industry.

Up to 1991 integrated standardization programs for the development of state, republic, and industrial standards and specifications used to be adopted every five years with a view to constantly improving quality parameters. All these works used to be financed by the state budget. At present this system does not exist, and development of standard specifications is not regulated by an adopted plan, but is motivated by a need for a specific document. The development of standards is financed by interested parties, which most frequently are, regretfully, foreign companies. Domestic associations of manufacturers and consumers do not manifest due interest in keeping the regulatory documents at a sufficiently high level.

The regulatory specifications for building glass and building-glass products currently in force in Russia include 2 inter-CIS standards, 21 state standards of the USSR, 2 state standards of the Russian Federation, and a number of specifications for the above products. The numbers and names of the standards are listed below.

LIST OF STATE STANDARDS FOR BUILDING GLASS AND METHODS FOR ITS TESTING

GOST 111–90. Sheet glass. Specifications.

GOST 5533–86. Sheet figured glass. Specifications.

GOST 7481–78. Sheet wire glass. Specifications.

GOST 8894–86. Glass pipes and profiled fittings to them. Specifications.

GOST 9272–81. Hollow glass blocks. Specifications.

GOST 21992–83. Building section glass. Specifications.

GOST 24866–89. Glued double glass panes. Specifications (currently being revised).

GOST 17057–89. Facing glass mosaic tiles and mosaic tile carpets. Specifications.

GOST 10134.0–82 – GOST 10134.3–82. Inorganic glass and glass ceramic materials. Methods for assessing chemical resistance.

GOST 11067–85. Inorganic glass and glass ceramic materials. Methods for assessing impact elasticity.

GOST 10978–83. Inorganic glass and glass ceramic materials. Method for assessing temperature coefficient of linear expansion.

GOST 9900–85. Inorganic glass and glass ceramic materials. Methods for assessing elasticity modulus under lateral static bending.

GOST 25535–82. Glass articles. Methods for assessing thermal stability.

GOST 9553–74. Silicate glass and glass ceramic materials. Method for assessing density.

GOST 22279–76. Hardened enamel glass "stemalite." Specifications (cancelled).

GOST 26302–93. Glass. Methods for determining directed light transmission and light reflection coefficients.

GOST R 51136–98. Protective multilayer glass. General specifications.

Glass with a low-emission solid coating. Specifications (being developed for the first time).

GOST 10499–95. Heat-insulating staple fiberglass products. Specifications.

GOST 22620–83. Stone-cast pipes. Specifications (cancelled).

GOST 19246–82. Slag glass ceramic sheets and slabs. Specifications (cancelled).

[1] GIS (State Institute of Glass) JSC, Moscow, Russia.

GOST 17177–94. Heat-insulating building materials and products. Testing methods.

GOST 7076–87. Building materials and products. Method for assessing thermal conductivity.

GOST 26602–85. Windows. Method for assessing heat-transmission resistance.

GOST R 50418–92. Soluble sodium silicate. Specifications.

GOST 11103–85. Inorganic glass and glass ceramic materials. Method for determining thermal stability.

GOST 16297–80. Soundproof and sound-absorbing materials. Testing methods.

ST SÉV 2052–79. Glass. Method for checking internal stress in glass articles.

Multilayer building glass (the standard is currently being developed).

Hardened building glass (the standard is currently being developed).

OST 21–67.0-91 — OST 21–67.12-91. Soda-lime glass: building, engineering, light engineering, container, and special household glass. Methods for determining the content of the main chemical components in glass.

It can be seen that most of the standards are over 10 years old, i.e., they are obsolete.

Moreover, two standards that for various reasons were once canceled are still in force. Thus, GOST 22279–76 "Hardened enamel glass 'stemalite.' Specifications" was cancelled, and yet stemalite is now more and more frequently used in construction.

It should be noted that at present certain state standards are in force, although those products are not produced, whereas some promising products arrive on the Russian market, and corresponding specifications do not exist. Such is the situation with glass pipes that are not made in Russia, although they are promising products that are indispenable in transporting aggressive chemicals. Their main manufacturers in the CIS are the Lomonosov Glass Factory in Gomel (Belarus) and the Buchanskii Glass Factory (Ukraine). Foam glass is not currently produced in Russia and is imported from Belarus. At present several companies intend to start foam-glass production in Russia, since this is a highly efficient heat-insulating material, but there is no standard for foam glass in Russia.

An analysis of regulatory documents for building glass in force in Russia revealed the following:

Quantitative aspect:

the overwhelming majority of the standards regulate requirements imposed on products and exist in the form of specifications;

12 standards are devoted to testing methods; there are no standards for computational methods for determining parameters (properties). An example of such methods is the standard ISO 9050:1990 "Glass in construction: determination of light transmission, direct solar transmission, total solar-energy transmission, ultraviolet transmission, and corresponding glazing parameters," which makes it possible to determine appropriate coefficients for various types of glazing (multiple glass panes, multilayer glass, etc.) using calculation formulas without the need for costly lab equipment;

documents regulating material consumption norms in the production of glass and glass articles are inadequately represented: the one standard ST SÉV 5865–87 "Tank furnaces for making stretched sheet glass. Calculation of power-consumption parameters" was introduced by direct application;

there is only one terminology standard ST SÉV 2439–80 "Building glass articles. Terminology and definitions," but it contains a limited range of terminology, has some inaccuracies, is rather obsolete and needs to be revised, although the demand for such a standard is urgent, due to existing confusion in terminology, especially in the characteristics of new types of glass with special properties;

there are no standards for application of building glass and environmental protection;

there are no state standards for new types of glass that are increasingly commonly used in construction: multilayer building glass, fire-resistant glass, glass of increased strength, glass with special properties (low-emission, heat-resistant), glass with coatings.

Qualitative aspect:

in developing domestic standards researchers used to study international standards, standards of the Council for Mutual Economic Assistance, and especially national standards of foreign countries, and therefore the majority of the domestic standards, in their quality parameters, correspond to the world level of the late 80s – early 90s but are significantly behind contemporary requirements with respect to the product range and the quality parameters; for example, GOST 111–90 for grade M_1 glass allows four exterior defects per m^2, whereas EN 572-2 "Glass in construction – Basic products – Part 2: Float glass" allows one defect per 20 m^2;

the areas of glass application have changed with respect to the requirements of the standard; for instance, GOST 111–90, when developed (the end of the 80s), was a document describing sheet-glass grades and application areas with prospects for future use. However, with the development of construction technologies and more complex glass structures, builders do not limit themselves to grade $M_4 - M_6$ glass in glazing and mostly use grade M_1 glass, although the above standard recommends the latter grade for high-quality mirrors and automobile windshields;

with respect to the terminology used, most standards are oriented to knowledgeable specialists and sometimes are difficult to comprehend for ordinary consumers;

with respect to quality parameters and regulated requirements, domestic standards are more overloaded than their foreign analogs;

standards have obligatory and reference requirements; however, some standards also contain technological requirements, which should be excluded and transferred to production forms and records;

standards do not always have a sufficient amount of reference data, which hampers the choice of a specific product for the consumer; thus, current standards do not contain strength parameters of different grades of building glass, which is necessary for designing buildings and structures under modern conditions;

the "Acceptance regulations" paragraph often regulates acceptance logistics, in particular, contains obligatory requirements imposed on quality-control acceptance; these requirements should be excluded, since according to the RSFSR Law "On production enterprise," ensuring product quality is an internal responsibility of the enterprise;

acceptance rules in most standards are based on statistical control methods; however, for some types of products these methods should be refined and simplified; this primarily concerns sampling volumes and defect acceptance level (AQL).

control methods correspond to a range of quality parameters but they are based on measurement, testing, and analysis of finished goods; computational methods are absent, which hampers the choice of a product by a consumer and a consumer's input control; the problem is that most house-building and wood-processing factories, not to mention construction sites, have virtually no metrological instruments;

standards virtually take no account of the possibility of outside expert evaluation of product quality under the conditions of service in buildings and structures;

standards contain the paragraphs "Packaging," "Transport and Storage"; it would be advisable to consider the possibility of exclusion or maximum possible simplification of these paragraphs, their transformation into recommendations (for inclusion of these recommendations in supply contracts), since they depend to a large extent on the specific conditions of delivery, transport distance, type of transport, regional conditions, and other specific conditions of use; such paragraphs are absent from foreign standards;

there are virtually no paragraphs regulating requirements placed upon installation, service, and safety in using glass articles, which is especially important now in connection with the appearance of new types of building glass products; for example, foreign regulations prohibit using ordinary window glass in glazing above the second floor, and only safety glass panes can be used.

The results of the analysis of existing standards suggest the following:

current standards do not form an integrated system, which hampers their use by consumers and manufacturers;

with respect to their content, structure, wording, and range of prescribed properties, the standards do not always respond to the changed relationship between the user and the supplier, on the one hand, and between companies and the state, on the other hand;

with respect to their quantity and their prescribed parameters, current standards do not fully satisfy the demands of contemporary consumers and state agencies regarding product range.